**ANALYSIS OF MULTISPECTRAL GALILEO SSI IMAGES OF THE CONAMARA CHAOS REGION, EUROPA.** N. A. Spaun[1] and C. B. Phillips[2], [1]NASA Ames Research Center, MS 245-3, Moffett Field, CA 94035, nspaun@mail.arc.nasa.gov [2]SETI Institute, Center for the Study of Life in the Universe, 2035 Landings Drive, Mountain View, CA 94043, phillips@seti.org

**Introduction:** Multispectral imaging of Europa's surface by Galileo's Solid State Imaging (SSI) camera has revealed two major surface color units, which appear as white and red-brown regions in enhanced color images of the surface (see figure). The Galileo Near-Infrared Mapping Spectrometer (NIMS) experiment suggests that the whitish material is icy, almost pure water ice, while the spectral signatures of the reddish regions are dominated by a non-ice material. Two endmember models have been proposed for the composition of the non-ice material: magnesium sulfate hydrates [1] and sulfuric acid and its byproducts [2]. There is also debate concerning whether the origin of this non-ice material is exogenic or endogenic [3].

First order analyses of SSI data have suggested that the reddish non-ice material is generally associated with ridges, bands, chaos, and lenticulae [4]. The intensity of the red coloration is apparently greater for features that are geologically younger [5,6,4]. Research has also shown that such reddish features may brighten, or whiten, with time [6].

A more detailed approach to the analysis of multispectral SSI data entails using thorough calibrations and a correction for scattered light. Early in the Galileo mission studies of the Galileo SSI data for the moon revealed discrepancies of up to 10% in relative reflectance between images containing scattered light and images corrected for scattered light. Scattered light adds a wavelength-dependent low-intensity brightness factor to pixels across an image [7]. For example, a large bright geological feature located just outside the field of view of an image will scatter extra light onto neighboring pixels within the field of view. Due to the wavelength dependence of this effect, a scattered light correction must be performed on any SSI multispectral dataset before quantitative spectral analysis can be done. We have used a modified version of the procedure described previously [7,8].

**Goals:** The key questions this work addresses are: 1) Is the non-ice material exogenic or endogenic in origin? 2) Once emplaced, is this non-ice material primarily modified by exogenic or endogenic processes? 3) Is the non-ice material within ridges, bands, chaos, and lenticulae the same non-ice material across all such geological features? 4) Does the distribution of the non-ice material provide any evidence for or against any of the various models for feature formation? 5) To what extent do the effects of scattered light in SSI images change the spectral signatures of geological features?

**Data:** The Galileo SSI experiment provided multispectral images in the following filters: violet (central wavelength = 413 nm), green (560 nm), red (665 nm), near-IR (756 nm), methane 2 (889 nm), and near one micron (968 nm). For this work we have selected a series of images of Conamara Chaos and the surrounding region. These images, taken on the Galileo spacecraft's twelfth orbit through the Jovian system, are centered around latitude 8 degrees north, longitude 277 degrees, at a resolution of 170 meters per pixel.

The region considered in this analysis includes a variety of surface features. The images contain a number of examples of the long linear features crossing Europa's surface, including ridges, troughs, and bands. There are also a number of different disrupted features, including chaotic terrain and low-albedo spots. The region also includes rays from the young impact crater Pwyll, located about a thousand kilometers to the south.

**Preliminary Results:** Our initial analysis of the association between color and geology allows us to eliminate one possible combination of processes. Because of the sharp contacts visible between geologic units, we can infer that this is not exogenic material affected by exclusively exogenic means. For example, one such region can be seen at the southern boundary between the reddish disrupted terrain of Conamara Chaos and the whitish ridged plains.

Qualitative analysis of the color intensity suggests that the rays are whiter and brighter than the ridged background plains. Also, the color of the reddish material associated with disrupted terrain seems to be comparable to the reddish material associated with linear features.

Once the scattered light correction described previously is implemented and applied to the images, we will be able to quantitatively analyze the color Conamara image mosaic. This, in turn, will allow us to perform spectral analyses of various surface materials in order to determine their origin and subsequent processing.

**References:**

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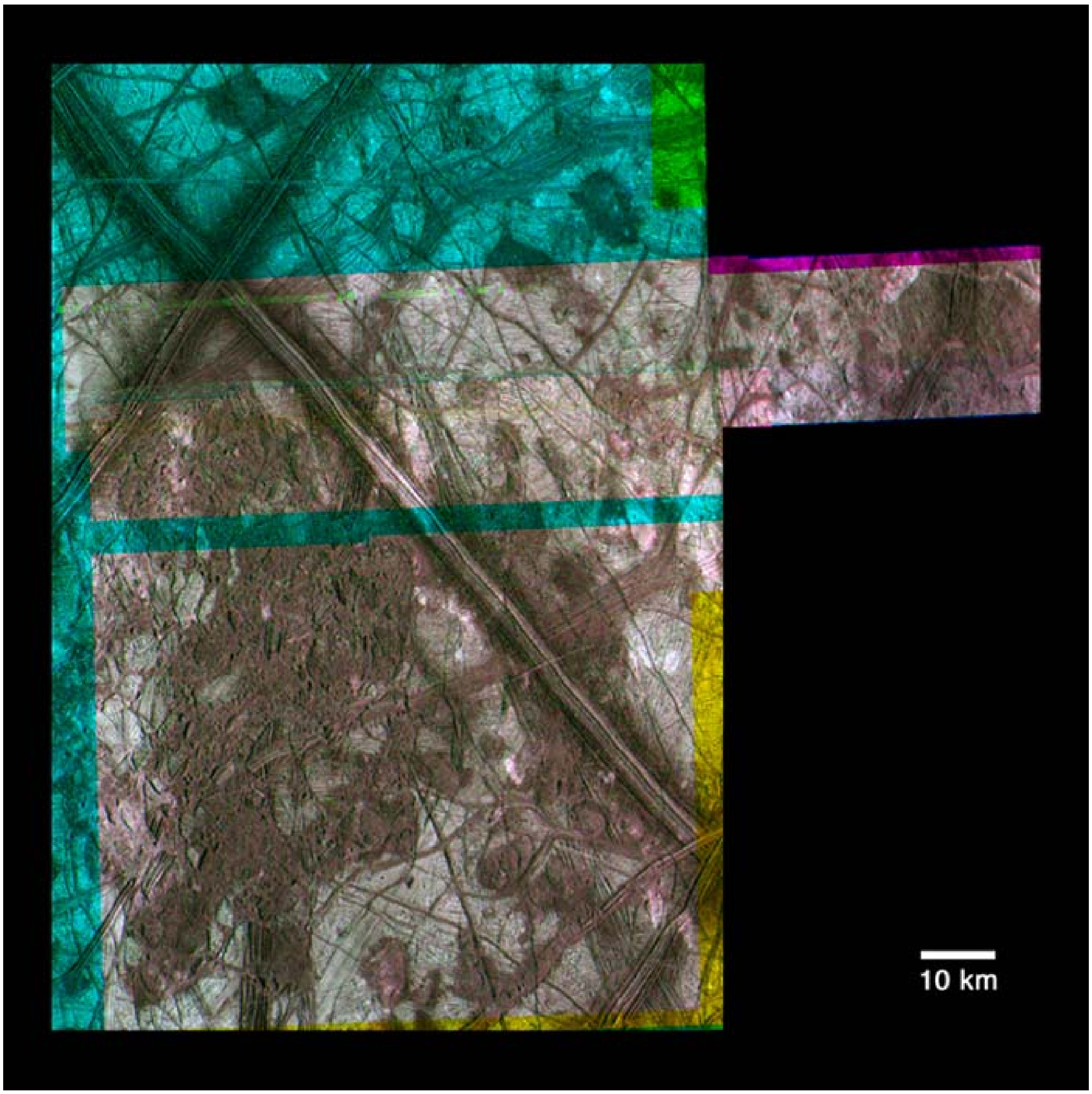


**Caption**: This image includes data taken in the 0.756 micron, green, and violet filters. Conamara Chaos is the mottled reddish-brown region below the X-shaped intersection of the two brownish linear features toward the top of the images. Areas in the image where data is missing in one or more bands are visible as the multi-colored swatches (e.g. cyan, yellow).